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APPENDIX J

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Free Learning Day: An Experiment in Self-Directed Learning [1]

Rosanne Steinbach

P. J. Burtis

Marlene Scardamalia

Ontario Institute for Studies in Education

Objective: To see how children would go about planning and pursuing learning goals given hardly any constraints or guidance.

Introduction

Few people would question the social and educational significance of fostering intentional learning in school students. This implies helping children to become active agents in their own learning. Some of the defining features of self-directed learning were observed by Giaconia and Hedges (1982):

> "Child is active in guiding her own learning; child actively chooses materials, methods, and pace of learning; role of teacher as resource person; less teacher-centered instruction and more student-centered instruction" (p. 593).

This is a good description of the observable features of an ideal learning situation. However, it says little about how to bring about this situation, and from the point of view of intentional learning, the concentration on observable features ignores a crucial issue, which is the attempt on the part of the learner to direct the cognitive processes involved in learning. The present study is concerned with these two aspects of intentional learning.

The basic question underlying the research reported here is what would it take to help children take charge of their own learning? As a first step to answering this question, the present study sought to investigate childrens' spontaneous ability to set and pursue their own learning goals under minimum constraints and minimum guidance. The method is simply to give children two 'free learning days' during which

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they were free to learn anything they might wish. We then interviewed the children about what they were doing. Some of the specific questions relating to intentional learning that we hoped would be answered by the experiment were the following: 1) What kinds of learning goals would children set for themselves?; 2) What kinds of procedures would they use to carry out this learning?; 3) What would they do if they ran into obstacles?; and 4) Would they automatically monitor and adjust their thinking and/or activities to accommodate new developments? The answers to these questions will give a picture of students as intentional learners when left to their own devices.

Methods

Subjects for this study were 62 students in 2 grade 5/6 classes from a public elementary school serving a middle to high income urban area. Students in one of these classes constituted part of the sample in the long-term learning goals interview study (see Appendix C). (Results of the interview study are reported separately. Briefly, in that study students in grades 3 and 6 were questioned about how they would use one hour a week for a year to learn anything they wished.)

The students in these classes were informed that they would have an hour a day during the next two days to learn anything they wished, and that they were responsible for planning the learning and obtaining any necessary materials themselves. Five experimenters, using tape-recorders, monitored the sessions. Each experimenter monitored 6 or 7 subjects who were seated near each other.

Experimenters checked with each student four or five times during the sessions asking questions such as: "How did you choose that? Why?; What are you reading about? Why?; What are you doing? Why?; What are you doing now? Why?" These questions were meant to be as unintrusive as possible with experimenters reminded not to make judgments or ask leading questions such as "What are you looking for?" The aim was to get as accurate a picture as possible of the children's learning behavior

with probing used simply to capture the data on tape.

Because we want to make comparisons between responses given during the interview study and behavior exhibited during this observation study, only the students who also received the interview will be considered here. (One group of seven students were also not included because they did not take the task seriously. They spent the two sessions whispering and giggling among themselves.) This subsample consists of 22 subjects in one grade 5/6 class. The scoring scheme that was developed for the interview study was also used to analyze the data from this experiment (see Table 1).

Insert Table 1 about here

What Does a Free Learning Day Look Like?

Aside from the group of seven students omitted from this study, (see methods section) interest at the start of day one was fairly high and, with 2 exceptions, students were prepared to pursue some sort of learning goal. For most of the children the preparation involved picking a topic of some interest to them and getting the appropriate volume from the set of encyclopedia that was kept in the classroom. A few of the children had brought books from home or the school library. The two children who were unprepared received permission to go to the library at the beginning of the session.

The students selected a variety of topics. Ten students wanted to learn how to do something: of these, five wanted to learn how to draw better, and five wanted to learn how to do something else (be a comedian, make clothes, play a hand-held computer game, make a camera, and play the piano--the last two also included finding out information about the medium). The remaining twelve wanted to learn about particular topics. Four decided to learn about particular animals, three chose

something to do with the solar system, two chose to learn about a particular country, one chose robots, one natural medicine and the medical wars, and one hypnosis and the subconscious. Although many children seemed to be learning about something that was truly important to them, only one picked a topic that was directly related to other learning he had been pursuing. This child wanted to expand his knowledge of the solar system and distant planets because he had already completed a project on space travel and "space ships go around the solar system."

Most of the children set to work reading their encyclopedia entry (or other book) and taking down notes. (Three exceptions were 2 children who wanted to learn how to draw and the child who wanted to learn how to play her computer game). For these children, reading and taking notes constituted learning. Children said they were picking information that was interesting or important. For most, the notes were taken in the same order as they appear in the source book with many children aware of the need to put the notes in their own words. This did not involve grappling with ideas in order to capture the gist of the message; it meant instead changing the odd word here and there. One child consulted a dictionary and one a thesaurus to facilitate this word change. Several children searched their resources for specific information they needed. Of all of the children who were researching encyclopedia topics, only one child read without taking any notes.

Three of the 5 children who wanted to improve their drawing abilities used books and they tended to follow the instructions given and then practice. The other two simply worked on their drawings.

Most of the children worked until the time was up albeit with frequent interruptions to chat with their neighbors. At the end, most children felt that they had only made a start towards their learning goal. This was particularly true for those students who had specific aspects of a topic they wished to learn.

Results

Comparison of interview data for subsample with complete sample

The interview data for this subsample of 22 subjects are very similar to the interview data for the complete set of 5/6 graders. (see Figure 1 (subsample) and Figure 2 (complete sample of 5/6). For the interview data of this subset, 53% of all scores occur in categories Ib, IIIc, and IVa with 28% occurring at level 1. For the complete set, 52% of all scores are in those categories with 29% occurring at level 1. Thus, the subsample appears to represent the entire sample accurately.

Insert Figures 1 and 2 about here

Comparison of Interview and Observation Data

One rater scored the observation protocols according to the scoring scheme described in the Children's Implicit Theories of Knowledge and Learning report (see Appendix C). Mean scores on the continuum scale for the observation protocols were compared with those obtained by the same students for the interview data, and they were not significantly different (observation, $\bar{x} = 2.03$; interview, $\bar{x} = 1.88$). The opportunity to actually set and pursue personal learning goals, as opposed to simply thinking about it, does not appear to dramatically alter the basic view of learning demonstrated by these students.

While the overall mean scores are fairly similar, the pattern of responses among the six categories show some slight, but interesting, differences between the interview and observation conditions. (see figures 1 and 3).

Insert Figure 3 about here

For the observation, as for interview, Topic vs. Goal (Ib) and the use of Routine

vs. Problem-solving procedures (IIIc) are still high frequency categories, including 40% of all responses (31% for interview). However, frequency of response for backward vs. forward looking evaluation (IVa) is now substantially lower including only 3% of all responses (22% for the interview). This discrepancy reflects the fact that during the interview study, but not during the observation, children were explicitly asked to determine how they would know if they had learned what they wanted to learn. Thus the opportunity to produce evaluation responses of any type was not as prominent during the observation study. The low frequency of evaluation responses in the absence of direct questioning seems to underscore the fact that, left on their own, children in grades 5/6 do not plan for or take into consideration the need to evaluate outcomes. This contrasts with the experts in the interview study who often did consider forward looking evaluation of outcomes. We will now describe results for individual categories to see what the similarities and differences are between interview and observation.

Topic vs. Goal (Ib)

For category Ib there is an interesting shift. This category included 17% of the responses in the interview study and 20% of the responses in the observation study. However, while most responses (10%) occurred at level 1 (learning organized around topics and activities) during the interview, with only 7% at levels 2 through 5, most responses (14%) occurred at levels 2 through 5 (9% at level 3) during observation, with only 7% at level 1. The mean scores are 1.75 and 2.29 for interview and observation respectively.

This finding indicates that the trend that was evident in the interview data (i.e., children at grade 5/6 starting to think of learning more in terms of goals) becomes somewhat stronger when the students are actually trying to carry out new learning. The children are more likely to talk about specific items of information they need to

learn (instead of listing topics) and these items tend to be more strongly guided by their learning goal. For example, one boy during observation who wanted to learn how to make a camera talked about the need "to find out what parts are in a camera and how they work" because "it would help me when I'm building my camera." When the experimenter noted a discrepancy between the type of camera he was reading about and the camera he was intending to build, he replied, "I just want to learn about the camera itself. How it takes the pictures." There seems to be a more deliberate attempt to learn aspects of the topic that would help him reach his goal.

Use of Resources (IIa & b)

Use of resources (IIa & b) is virtually unchanged except for slightly higher mean scores. Mean scores for category IIb are 1.79 for interview data and 2.43 for observation. Children in both conditions tend to choose any readily available and topically relevant information source, but they are a bit more inclined in the observation condition to use them more selectively and critically. This reflects and is consistent with the increase in goal-directed behavior seen in category I. When children's efforts to learn are more strongly guided by their learning goals, the children are more apt to seek out specific information, and also to notice information that they can't find. One boy wanted to learn about Denmark for a planned trip there. He took notes from his encyclopedia on information that would be particularly useful for his trip. As he put it, "like who cares about the elevation and the population, right?"

Planning and Following a Course of Action (IIIa - f)

For the "Planning and Following a Course of Action" segment (IIIa - f) of the scoring scheme the overall picture is fairly similar for both interview and observation. However, there are some subtle differences within the subcategories which are interesting to note.

Use of Resources for Planning (IIIa)

There is an increase in the frequency of response in the category dealing with use of resources for planning (IIIa) from 6% for interview to 10% for observation, with the majority of responses in both conditions occurring at level 1. The increase in this category reflects the fact that 19 out of the 22 students in the observation condition used an encyclopedia or other resource book as a source of information. They tended to find the encyclopedia volume which included their topic and use the entry as their source of information. The exceptions were two children who wanted to improve their drawing abilities and one who wanted to learn how to play a hand-held computer game. (Three children who wanted to learn how to draw still used an encyclopedia or other book).

Decisions Among Alternatives (IIIb)

The category Decisions Among Alternatives (IIIb) also shows a greater frequency of use in the observation condition--10% as opposed to 4%--due perhaps to the fact that, when children are actually carrying out a plan of action, alternatives need to be dealt with. When children are simply imagining what they will do to learn they do not foresee the possibility of alternatives as often.

Procedures Used (IIIc)

As with the interview data, a large proportion of responses (20%) occurred in the category which looked at the actual procedures children used to carry out their plan of action (IIIc). In spite of the fact that children in the observation condition show an increase in their ability to think about learning in a more goal-directed way (see the section dealing with Ib), there is no corresponding trend to a more problem-solving approach to use of procedures. The mean for observation is 1.72, and for interview 1.62. This finding seems to indicate that, while children in grade 5/6 are beginning to be able to formulate learning goals, they lack the skills to carry out this learning in a more sophisticated way. They still rely heavily on routine procedures such as reading,

copying, writing down notes, and practice in the apparent belief that learning follows directly from these activities.

Scores at levels above 1 account for approximately 7% of responses in this category and they reflect attempts to paraphrase information from texts or, in a few cases, to skim the text for important information prior to taking notes. The routine procedure is to read a sentence and write it down nearly verbatim. There is some attempt to figure out what needs to be done (e.g., how to fix a drawing that isn't quite right) and to break down a task into its component parts.

Dealing With Difficulties (IIId)

Responses in the category which deals with difficulties (IIId) also show an increase in frequency, from 3% for interview to 7% for observation. This is not surprising. As we saw with the category that is concerned with considering alternatives (IIIb), children are not apt to foresee difficulties when they are merely speculating about a possible learning activity. When they are actually trying to learn something, difficulties inevitably arise. Sixteen children reached some sort of stumbling block during the observation period, but they tended not to look at these obstacles as problems to be solved. In fact, although there were fewer instances of children considering difficulties in the interview condition (18 as opposed to 33), the responses in the interview condition were rated at higher levels on the known-routine--problem-solving continuum, than those in the observation condition. The mean response to this category for the interview data was 3.17, and for the observation data 1.85. Being able to foresee difficulties is in itself a fairly sophisticated learning skill, and it may be that the few students who were able to do this were the more sophisticated learners, accounting for the higher mean score in the interview condition.

The children got "stuck" for a variety of reasons: unavailability or inadequacy of

books or materials they needed; being unsure of what else to do; getting bored; awareness of some task specific aspect that causes trouble e.g. difficulty understanding a word; something taking too long.

Reflecting about Decisions (IIIe)

If IIId was the category most often used when a difficulty was encountered, IIIe (Reflecting about Decisions) was often the category used to code attempts at resolution. Only one child who did not have a "stuckness" problem made a statement that was coded as IIIe. He changed a picture he was drawing from one type of wrestling move to another with no reason given.

For this category, the frequency of response is practically the same in both conditions, but the mean score obtained is higher for observation (observation $\bar{x}$ = 3.25; interview $\bar{x}$ = 2.00). In the observation condition, most responses for this category were at level 3 (11 out of 16) and this score reflects some uncertainty or deliberation about or slight changes in decisions. Only 1 statement is rated at level one which reflects that decisions once made are fixed. This child needed a certain piece of information but decided that there was nothing he could do to get it.

Ten subjects reconsidered decisions i.e. made statements coded as IIIe. Six of those subjects made such statements in direct response to difficulties they encountered. Of those six, four shifted their goals in order to accommodate those problems. One boy was having difficulty drawing identical owls for each panel of his comic strip (he had understood the importance of doing this). When he couldn't quite accomplish this goal, he decided to have all the slightly different owls be cousins. Two children, who couldn't find any information, chose a different topic. One boy, who didn't have the right material to make a camera, decided instead to use the time to learn more about how a camera works.

There was one child who deliberately changed goals, not because she was stuck,

but in order to take advantage of the learning she was doing for this study. As part of her school work, she was required to prepare a speech to present to the class. She had been unable to come up with a suitable topic for her speech and mid way through this study decided, instead of just learning about Koalas, to work on her speech using the information she had already gathered. (A sixth child also made a slight shift in goals to look at only one particular aspect of his topic but he couldn't say why).

Another example of an intentional change of plans (not goals) involved a student who had been taking notes in the order in which they appeared in the encyclopedia and then decided to reorder the information so that it made more sense.

Other responses reflected slight deliberation or uncertainty about decisions e.g., "I'm going to read some more for now. I might think of something else later."

Learning as Finite or Indefinitely Extendable (IIIf)

For category IIIf, the degree to which learning could be extended, there were only five statements made which were all at level 1. This type of statement indicates that the children had decided that there was nothing else to learn. There were 25 statements in this category for the interview condition. Perhaps it is simply that the observation situation provided little opportunity to indicate such beliefs one way or the other.

Evaluation (IVa)

We have already discussed the discrepancy in frequency counts between conditions for the evaluation category (IVa). Although there were few responses rated as occurring in this category during the observation (16 as opposed to 147) the mean score remains the same ($\bar{x} = 1.94$). If children talk at all about evaluation in the observation condition, they are basically using outcome measures to determine success with a start at using some criteria to evaluate performance.

Motivation (Va)

Although there were very few responses in this category for both conditions (4 in observation, 10 in interview), one might have expected motivation to play a much larger role during the observation in view of the importance of motivation in learning. While it might have been appropriate to rate a few additional statements in the Motivation (Va) category (e.g., "I'm not in the mood to learn"), they more easily fit into other categories (e.g., dealing with difficulties, IIId) and so were not included here. Nevertheless the absence of such statements reflects a genuine lack of concern for motivational considerations. Teachers typically take responsibility for this aspect of learning and children do not usually need to consider it at all.

Transfer or Expanding Contexts (VIa)

In both conditions, there was virtually no mention of transfer. In the observation there was only one such statement. This boy, who was reading and taking notes from his encyclopedia, was asked why he was doing that. "Well that's the way that I always record notes if I read it from a book." This was rated at level 1 which indicates the routine technique of reliance on near transfer or general procedures.

What does a high-scorer look like?

It might be helpful to present a composite description of the behavior of a typical high-scoring student in order to get a clearer picture of how the entire class operated. On the known-routine--problem-solving continuum, the mean score was 2.03 with a median of 2.08.

Children who score above the median tend to have a strong interest in or a need to understand what they are studying. It is not simply a randomly picked topic. There is the sense that, left on their own, these children might continue to pursue the goals they have set for themselves. They search for specific information they need and take notes on what they consider to be important or novel information. They are more likely to try to figure out what needs to be done rather than relying on routine

procedures of reading, writing, or practicing. For example, one girl, who was working on her speech, systematically tried to devise methods to aid in memorization. These students tend to be less easily distracted and they work fairly steadily until the end. While this is not truly goal-directed learning behavior, it does show that the children have the capacity to go beyond the routine, task-defined behavior that is characteristic of school work.

Conclusion

Although some educators believe that providing a free or open environment is enough to induce goal-directed learning behavior, this study provides evidence that just giving children the opportunity to pursue their own learning goals is not enough for them to direct their learning in a very intentional or problem-solving way. What these two "free learning days" do tell us, however, is that many of the children have glimmerings of some problem-solving skills that could be enhanced by instruction.

Few, if any, children can formulate clearcut high-level learning goals, but many have begun to identify specific learning objectives. No child adopts a means-end approach to carry out their learning, but many display some knowledge of the need to start breaking down a task into its components.

Nevertheless, what these children basically know how to do is assign themselves a job and do it. What is strikingly apparent is that the students in this class cannot envision any other way to go about learning. They don't even feel the need to act in any other way. Their habitual ways of dealing with school tasks have always served them well and they happily continue with the familiar methods even in this novel situation.

Still, as this report indicates, we have seen signs that children possess some rudimentary intentional learning skills and they are clearly ready to assimilate instruction in becoming an intentional learner. We have only begun to explore what such an instructional program will look like, but we know that it will need to be part of

the entire curriculum, not just an hour a week stuck on as an afterthought. We know that it will involve direct instruction of expert concepts of knowledge and learning. That includes teaching children how to set high-level learning goals along with the problem-solving skills that will enable them to accomplish these goals.

References

Giaconia, R. N., & Hedges, L. V. (1982). Identifying features of effective open education. Review of Educational Research, 52, 579-602.

Table 1

Protocol Analysis and Scoring Scheme

Contrasts between Problem Solving (ps) and Known Routine (kr)

I. Goals and Subgoals

1a. ps - goal formulated as problem to be solved
kr - goal formulated as expected outcome

- - - - -

Ib. ps - learning organized around goals
kr - learning organized around topics and activities

- - - - -

Ic. ps - subgoals based on prerequisites
kr - subgoals based on easy-to-hard or conventional ordering

- - - - -

Id. ps - goals based on specific perceived knowledge lacks
kr - goals based on general improvement or meeting external criteria (e.g. good grades)

II. Use of Resources

IIa. ps - selective search for information
kr - use of any topically relevant information sources that come to mind

- - - - -

IIb. ps - knowledgeable others and resources to be used selectively and critically
kr - knowledgeable others and resources as ultimate source of to-be-gained knowledge

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III. Planning and Following a Course of Action

IIIa. ps - available means, resources, etc. seen as placing constraints on plans
kr - available means, resources, etc. used as a source of plans

- - - - -

(table continued)

IIIb. ps - decisions among alternatives based on intermediate results
kr - alternatives seen as matters of preference or indifference

- - - - -

IIIc. ps - plan represents means to an end arrived at through problem solving
kr - use of routine procedures (practice, rehearsal, etc.) to produce desired outcome

- - - - -

IIId. ps - anticipating difficulties as problems to be solved
kr - foreseen difficulties accepted as facts of life

- - - - -

IIIe. ps - decisions reconsidered, revised, or elaborated during planning
kr - decisions, once made, are fixed

- - - - -

IIIf. ps - learning seen as indefinitely extendable
kr - learning seen as terminal (nothing more to learn)

IV. Evaluation

IVa. ps - forward-looking evaluation
kr - backward-looking evaluation

V. Motivation

Va. ps - motivation is a factor to be taken into account in decisions about how to proceed
kr - motivation is taken for granted when goals are self chosen

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VI. Transfer, Expanding Contexts

VIa. ps - use of analogy
kr - reliance on near transfer or general procedures

Scoring: Each response was scored on a five-point scale with 5 = ps end of the continuum, 1 = kr end, 3 = intermediate between the ends, 2 and 4 - tending toward one end or the other, but not clear-cut.

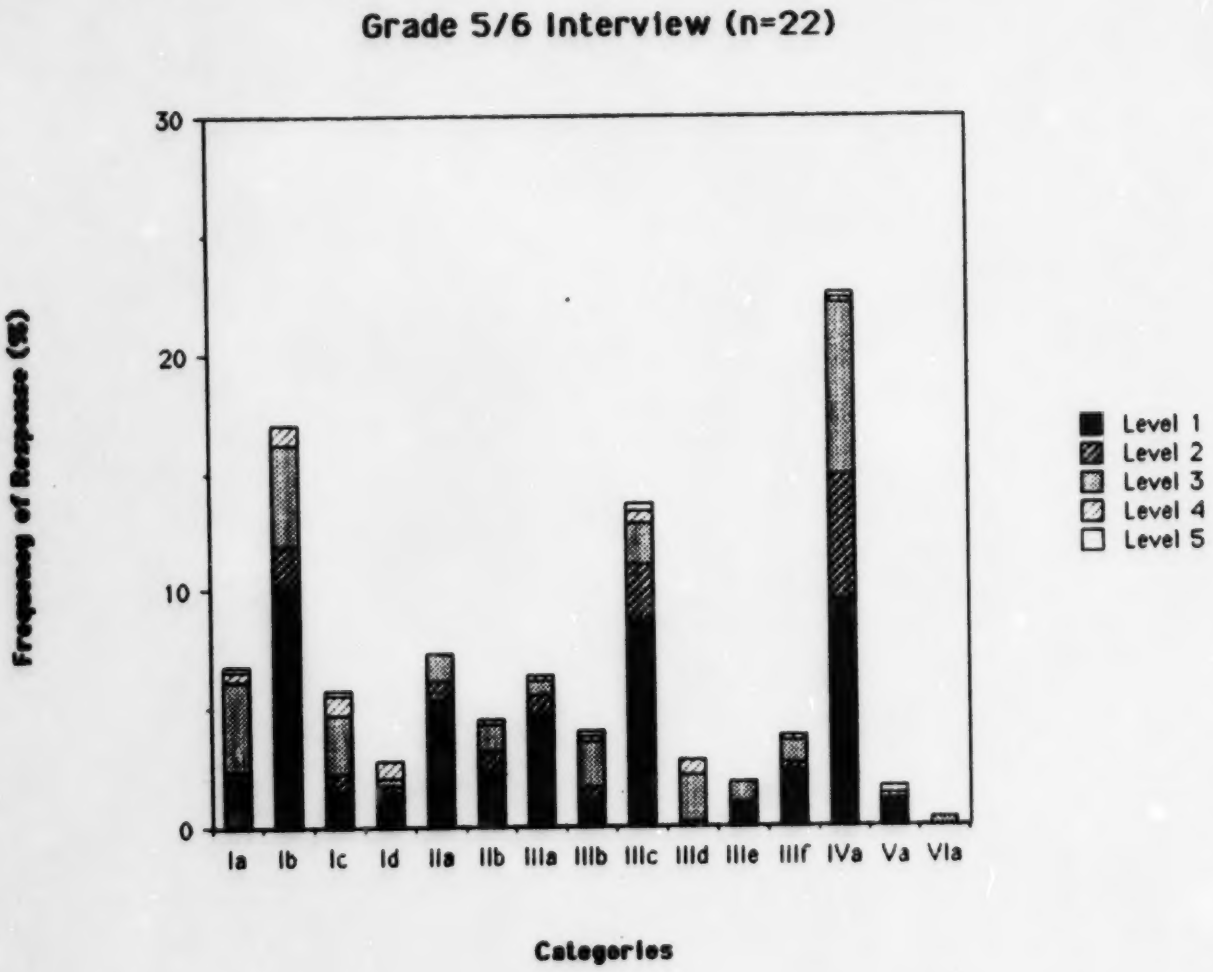

Figure 1: Distribution of responses for subsample (n=22) of grade 5/6 interview data on the known-routine (level 1) vs. problem-solving (level 5) continuum scale. For a description of the categories see text and Table 1.

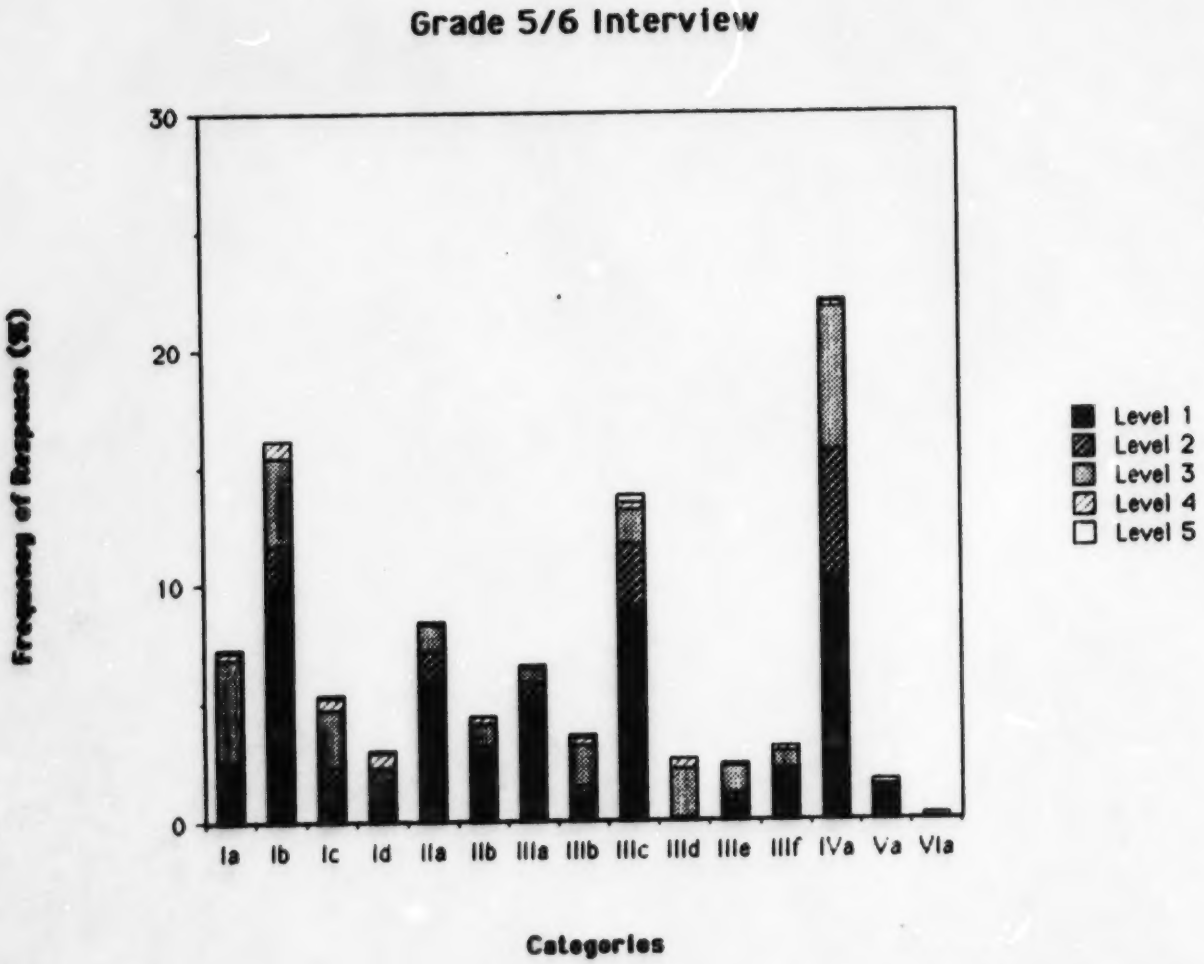

Figure 2: Distribution of responses for complete sample (n=31) of grade 5/6 interview data on the known-routine (level 1) vs. problem-solving (level 5) continuum scale. For a description of the categories see text and Table 1.

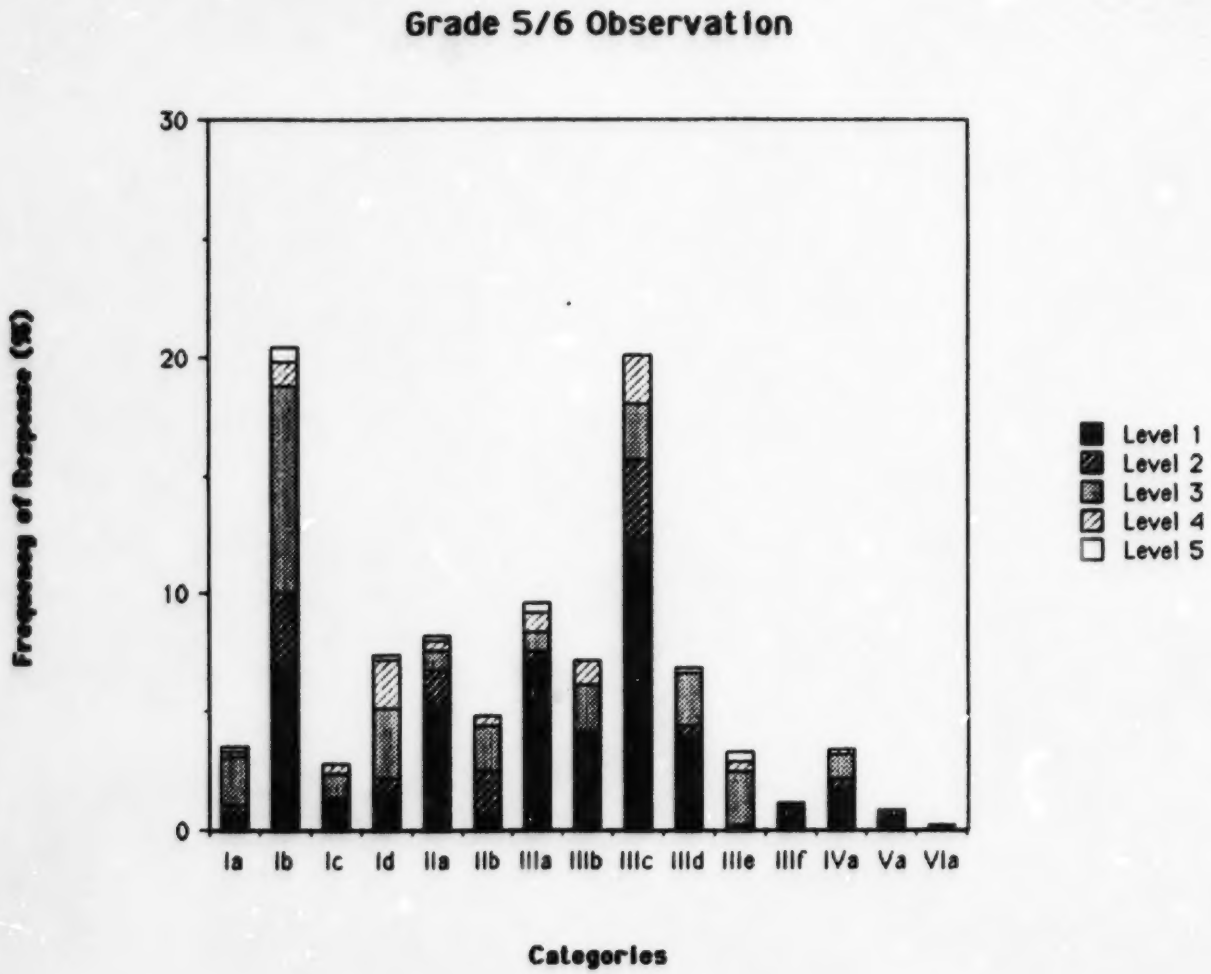

Figure 3: Distribution of responses for grade 5/6 (n=22) observation data on the known-routine (level 1) vs. problem-solving (level 5) continuum scale. For a description of the categories see text and Table 1.